

A row of wind turbines silhouetted against a vibrant sunset sky with orange and yellow hues. The turbines are positioned across the frame, with the closest one on the left and others receding into the distance.

# AI at Scale



**Activeeon**  
SCALE BEYOND LIMITS



Andrews CORDOLINO SOBRAL - [andrews.sobral@activeeon.com](mailto:andrews.sobral@activeeon.com)

Ph.D. on Computer Vision and Machine Learning

Senior AI Research Engineer, Machine Learning Team Leader at  
ActiveEon, Paris Office

15+ years of software development experience (8+ companies)

20+ scientific publications

70+ reviews on 20+ scientific journals

## Ph.D. Thesis

"Robust low-rank and sparse decomposition for moving object detection: from matrices to tensors"

## Education

**2013 - 2017** Ph.D. in Computer Vision and Machine Learning at **University of La Rochelle (L3I/MIA)**, France.

**2014 and 2015 (2 x 3 months)** Doctoral research stage at **Computer Vision Center (CVC)**, Barcelona, Spain.

**2010 - 2012** M.Sc. in Mechatronics Engineering at **Federal University of Bahia (Polytechnic School)**, Brazil.

**2004 - 2009** B.Sc. in Computer Engineering at **AREA1 Engineering School**, Brazil.

## Main research interests

Computer Vision, Image Processing, Machine Learning, Deep Learning,  
Matrix & Tensor Decomposition and Factorization, Applied Mathematics,  
and Optimization.

## Programming skills

C/C++, Python, MATLAB

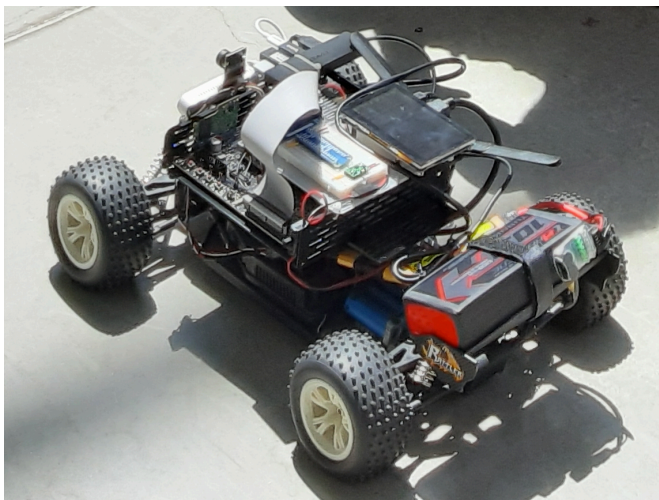
## Links

<http://andrewssobral.wixsite.com/home>

<https://github.com/andrewssobral>

<https://twitter.com/andrewssobral>

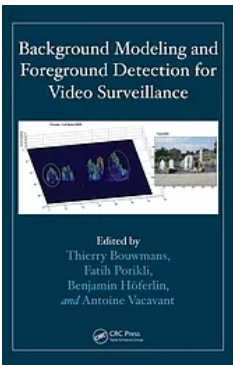
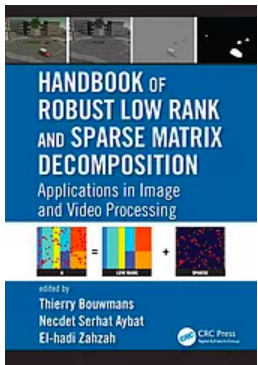
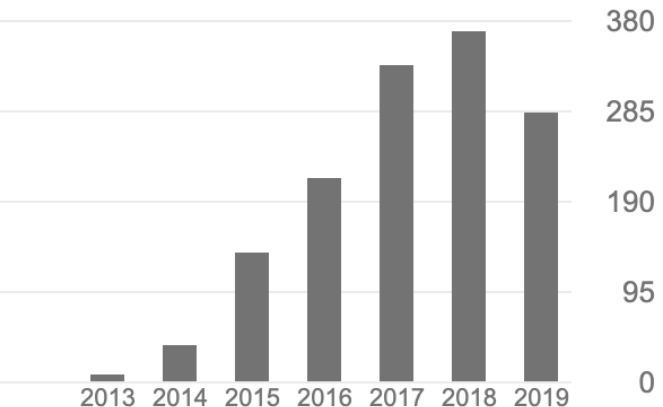
<https://www.linkedin.com/in/andrewssobral>



Google Scholar

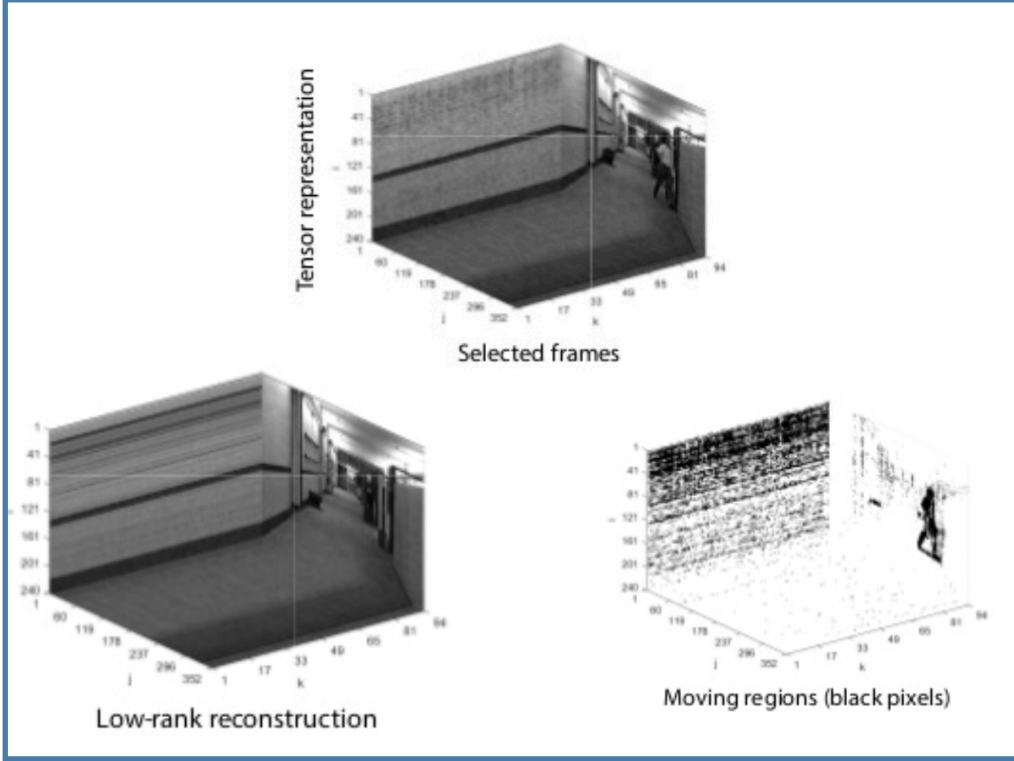
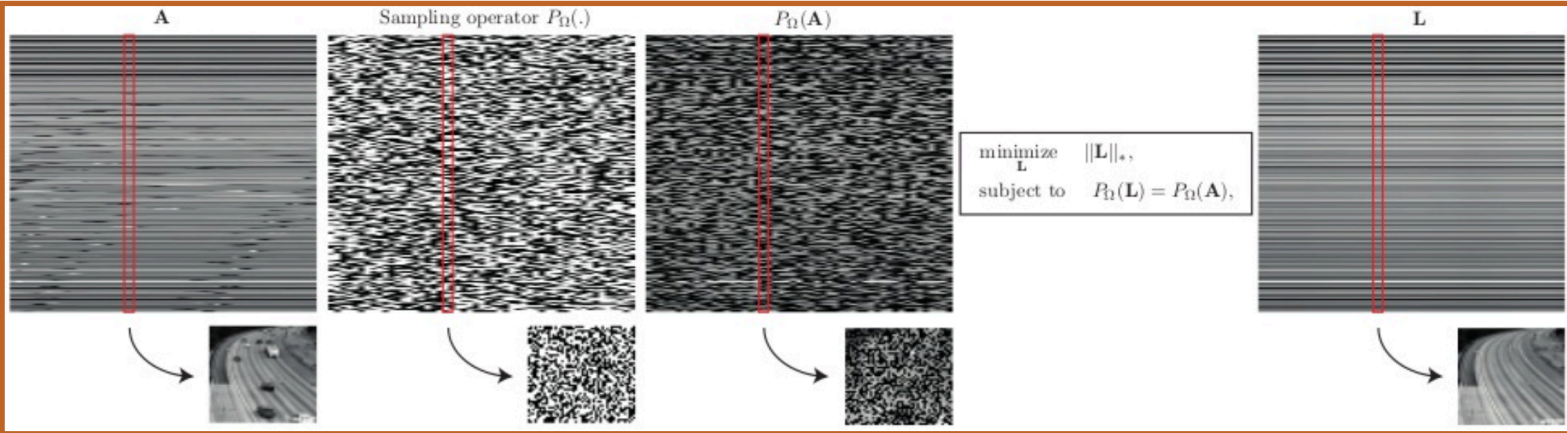
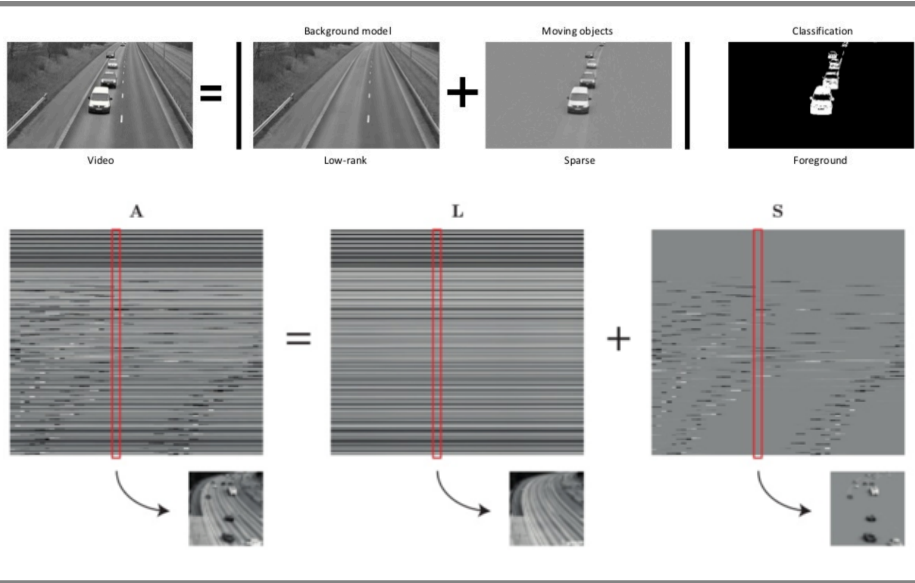
November, 2019

	All	Since 2014
Citations	1414	1395
h-index	16	16
i10-index	17	17





# Decomposition into low-rank + sparse components



# Activeeon Story



Denis Caromel, CEO and  
Founder

2005

- **An R&D Team of 45 persons headed by Denis Caromel** developing a Core Kernel for Distributed, Parallel & Cloud at INRIA (largest EU Computer Science Research Institute, 6000+ members).

2007

- **Foundation of ActiveEon**  
Co-development between INRIA Team & ActiveEon  
IP Technology Transfer from INRIA to ActiveEon

2009

- **Scheduler added to the Core**

2011

- **Resource Manager added**

2013

- **Orchestration with Powerful Workflows added**

2014

- **First very large customer references in Production**

2016

2017

- **International Expansions in UK, USA, Africa**

2018

- **Machine Learning Open Studio (MLOS) added to the ProActive Suite**

2019

- **New features added to MLOS: AutoML, Jupyter Kernel, Job Analytics, MaaS**

## Locations

Sophia-Antipolis (France)  
Paris (France)



# 2 products



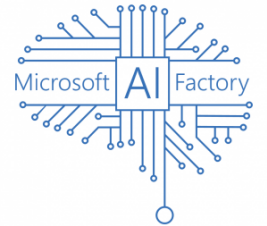
## PROACTIVE WORKFLOWS & SCHEDULING

For Gartner identified market of  
*"Workload automation and job scheduling, including Big Data/ETL"*.

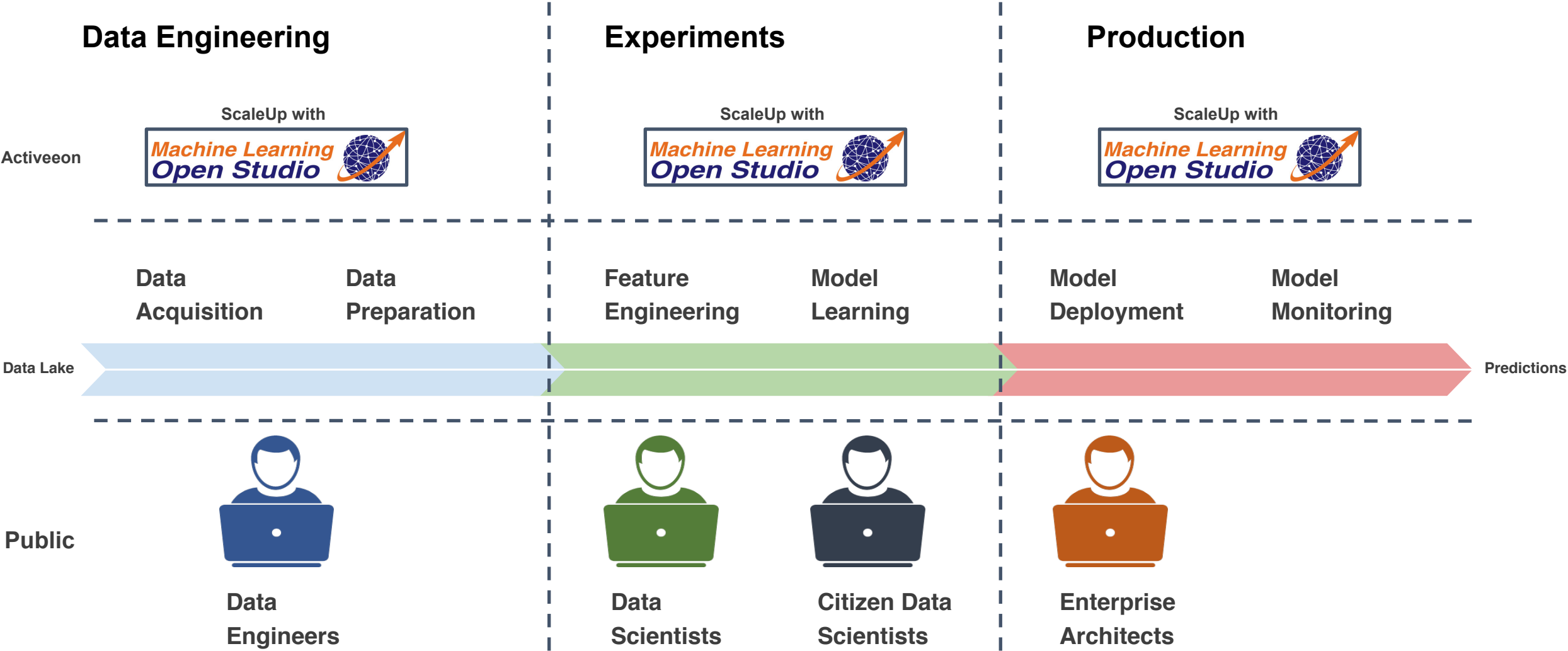


## MACHINE LEARNING OPEN STUDIO

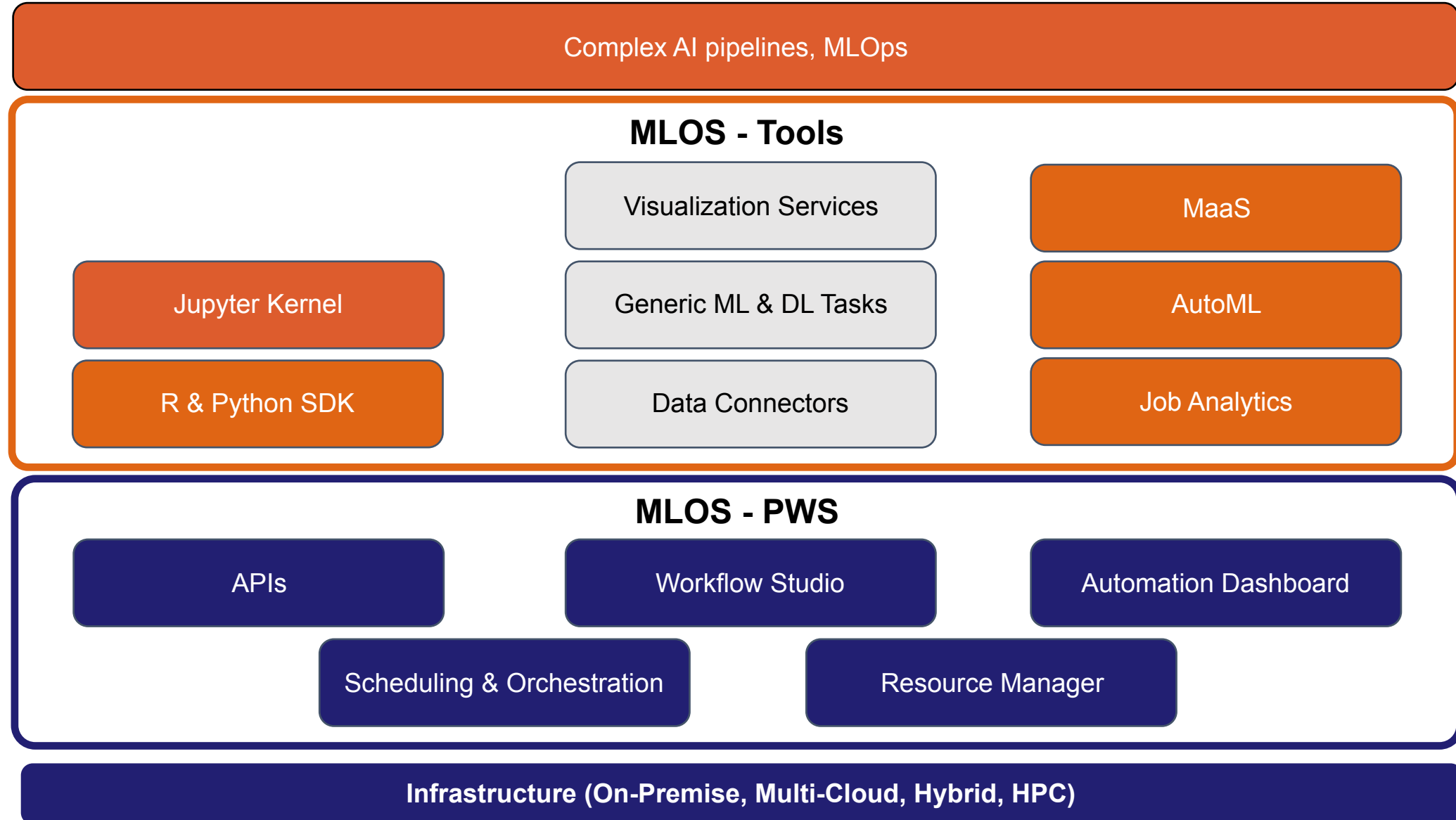
For Gartner identified market of  
*"Data Science and Machine Learning Platforms"*.



# Activeeon Solution Platform for AI

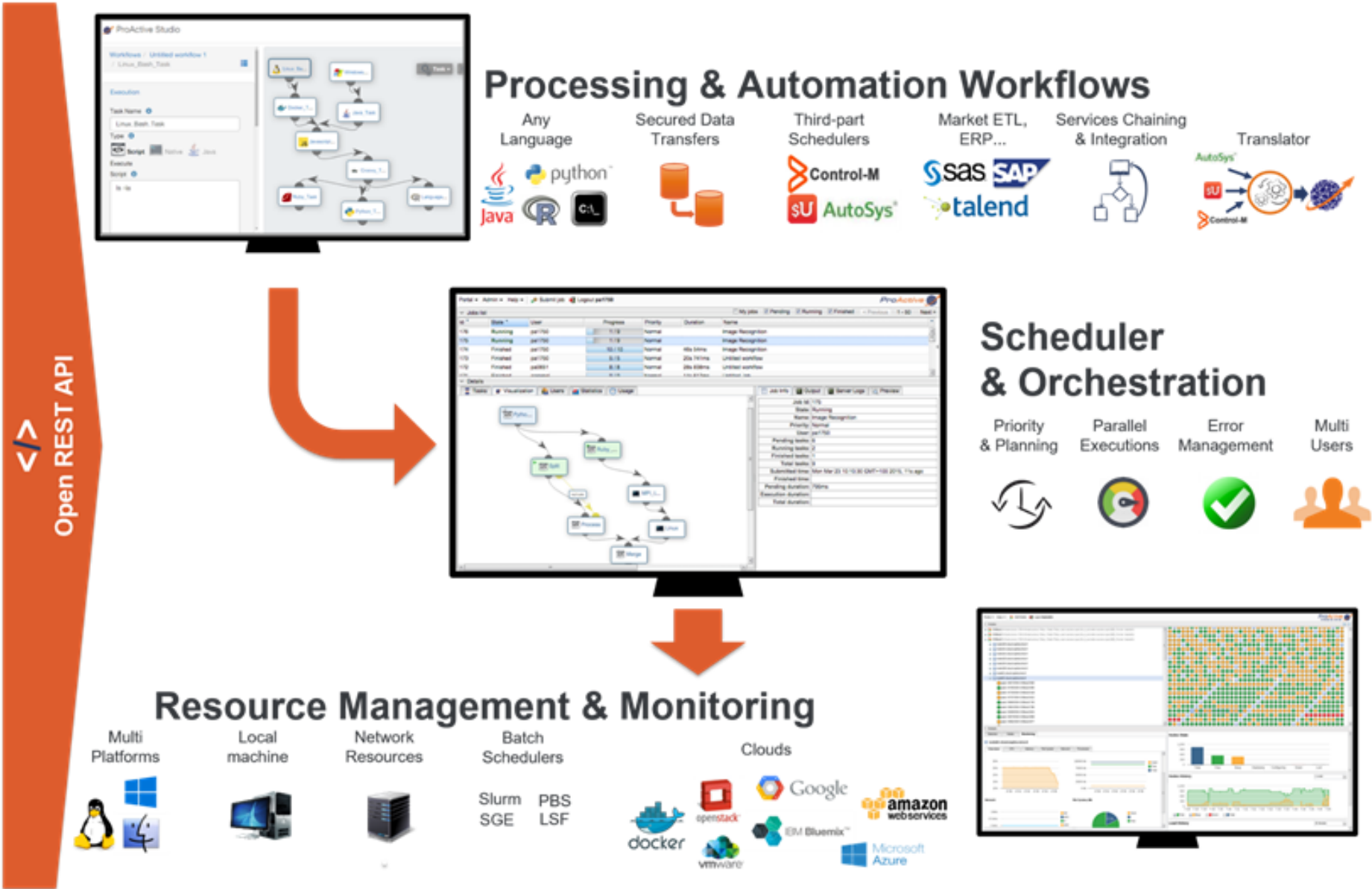


# The MLOS Suite





# MLOS - PWS, the core of the platform



# MLOS : Workflows Studio

User interface



ProActive Workflow Studio

MACHINE LEARNING



File Edit Catalog Execute Plan Help

Automation Dashboard Workflow Studio Scheduling & Orchestration Resource Manager sobral

Workflows / Emotion\_Detection\_In\_Bing\_Images

**General Parameters**

Name: Emotion\_Detection\_In\_Bing\_Images

Project: 1. Azure Cognitive Services

Description: This workflow is a mashup that searches for images of a person using Azure Bing Image Search then performs an emotion detection using Azure Emotion API.

Documentation: Undefined

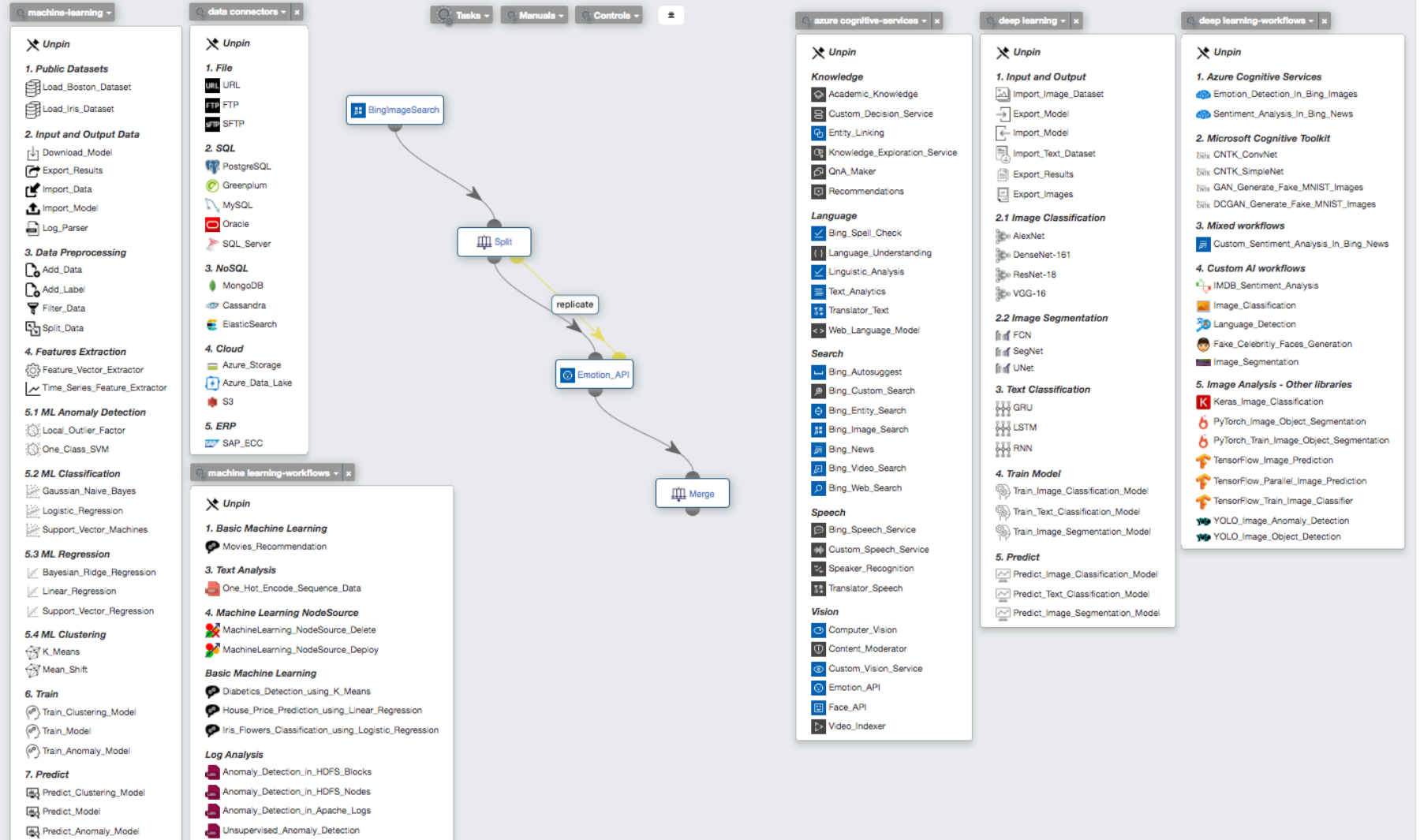
Job Priority: normal

**Workflow Variables**

**Generic Info**

**Data Management**

**Error Handling**



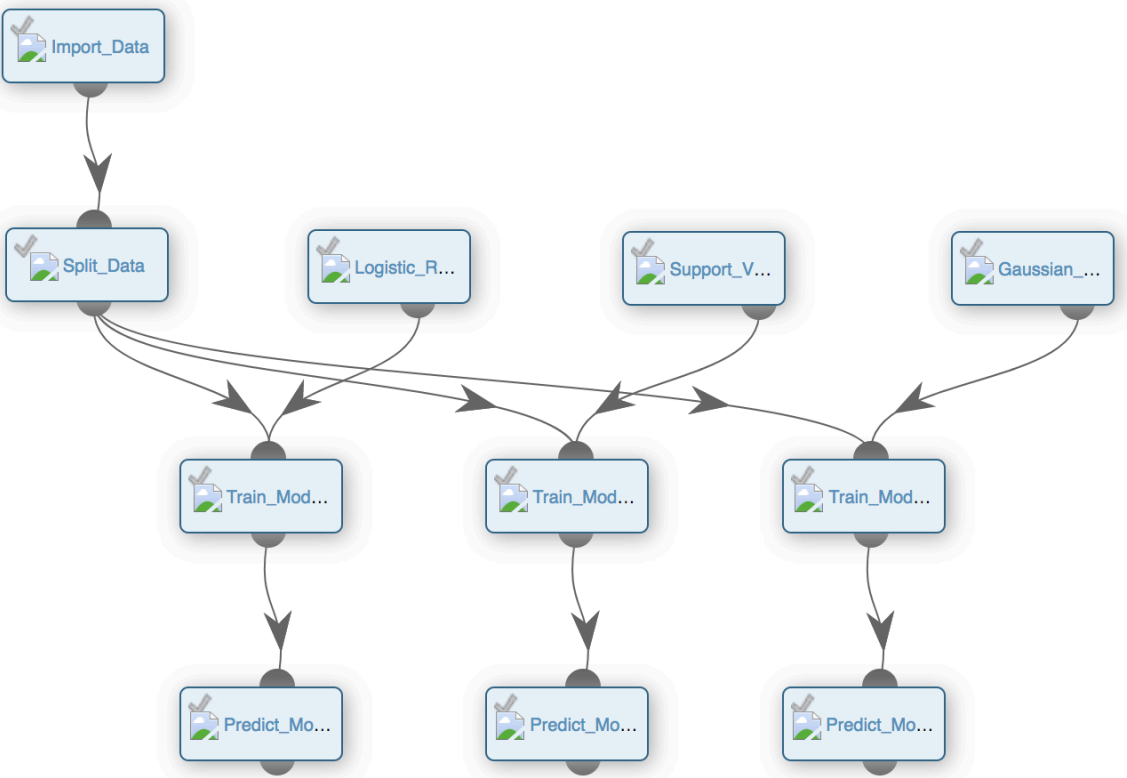
# MLOS : Parallel & Distributed Training

Details

Tasks Visualization Users Sessions Statistics Usage

Job Info Task Info Output Server Logs Preview

Streaming Output Selected job



```
graph TD; Import[Import_Data] --> Split[Split_Data]; Split --> Train1[Train_Model...]; Split --> Train2[Train_Model...]; Split --> Train3[Train_Model...]; Logistic[Logistic_R...] --> Train1; Support[Support_V...] --> Train2; Gaussian[Gaussian...] --> Train3; Train1 --> Predict1[Predict_Model...]; Train2 --> Predict2[Predict_Model...]; Train3 --> Predict3[Predict_Model...];
```

```
[90t0@trydev.activeeon.com;15:41:19] BEGIN Import_Data
[90t0@trydev.activeeon.com;15:41:19] END Import_Data
[90t1@trydev.activeeon.com;15:41:26] BEGIN Split_Data
[90t1@trydev.activeeon.com;15:41:26] END Split_Data
[90t2@trydev.activeeon.com;15:41:33] BEGIN Train_Model
[90t2@trydev.activeeon.com;15:41:33] END Train_Model
[90t5@trydev.activeeon.com;15:41:33] BEGIN Train_Model
[90t5@trydev.activeeon.com;15:41:33] END Train_Model
[90t8@trydev.activeeon.com;15:41:33] BEGIN Train_Model
[90t8@trydev.activeeon.com;15:41:33] END Train_Model
[90t4@trydev.activeeon.com;15:41:40] BEGIN Predict_Model
*****CLASSIFICATION MEASURES*****
[90t4@trydev.activeeon.com;15:41:40] ACCURACY SCORE: 0.77
[90t4@trydev.activeeon.com;15:41:40] PRECISION SCORE: 0.77
[90t4@trydev.activeeon.com;15:41:40] CONFUSION MATRIX:
[90t4@trydev.activeeon.com;15:41:40] [[133 22]
[90t4@trydev.activeeon.com;15:41:40] [ 32 44]]
[90t4@trydev.activeeon.com;15:41:40] *****
[90t4@trydev.activeeon.com;15:41:40] END Predict_Model
[90t9@trydev.activeeon.com;15:41:41] BEGIN Predict_Model
*****CLASSIFICATION MEASURES*****
[90t9@trydev.activeeon.com;15:41:41] ACCURACY SCORE: 0.74
[90t9@trydev.activeeon.com;15:41:41] PRECISION SCORE: 0.74
[90t9@trydev.activeeon.com;15:41:41] CONFUSION MATRIX:
[90t9@trydev.activeeon.com;15:41:41] [[124 31]
[90t9@trydev.activeeon.com;15:41:41] [ 29 47]]
[90t9@trydev.activeeon.com;15:41:41] *****
[90t9@trydev.activeeon.com;15:41:41] END Predict_Model
[90t6@trydev.activeeon.com;15:41:41] BEGIN Predict_Model
*****CLASSIFICATION MEASURES*****
[90t6@trydev.activeeon.com;15:41:41] ACCURACY SCORE: 0.67
[90t6@trydev.activeeon.com;15:41:41] PRECISION SCORE: 0.67
[90t6@trydev.activeeon.com;15:41:41] CONFUSION MATRIX:
[90t6@trydev.activeeon.com;15:41:41] [[155 0]
[90t6@trydev.activeeon.com;15:41:41] [ 76 0]]
[90t6@trydev.activeeon.com;15:41:41] *****
[90t6@trydev.activeeon.com;15:41:41] END Predict_Model
```



PRODUCT

# MLOS for AI Experts

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# MLOS : Python SDK

```
$ pip install proactive
```

```
import proactive

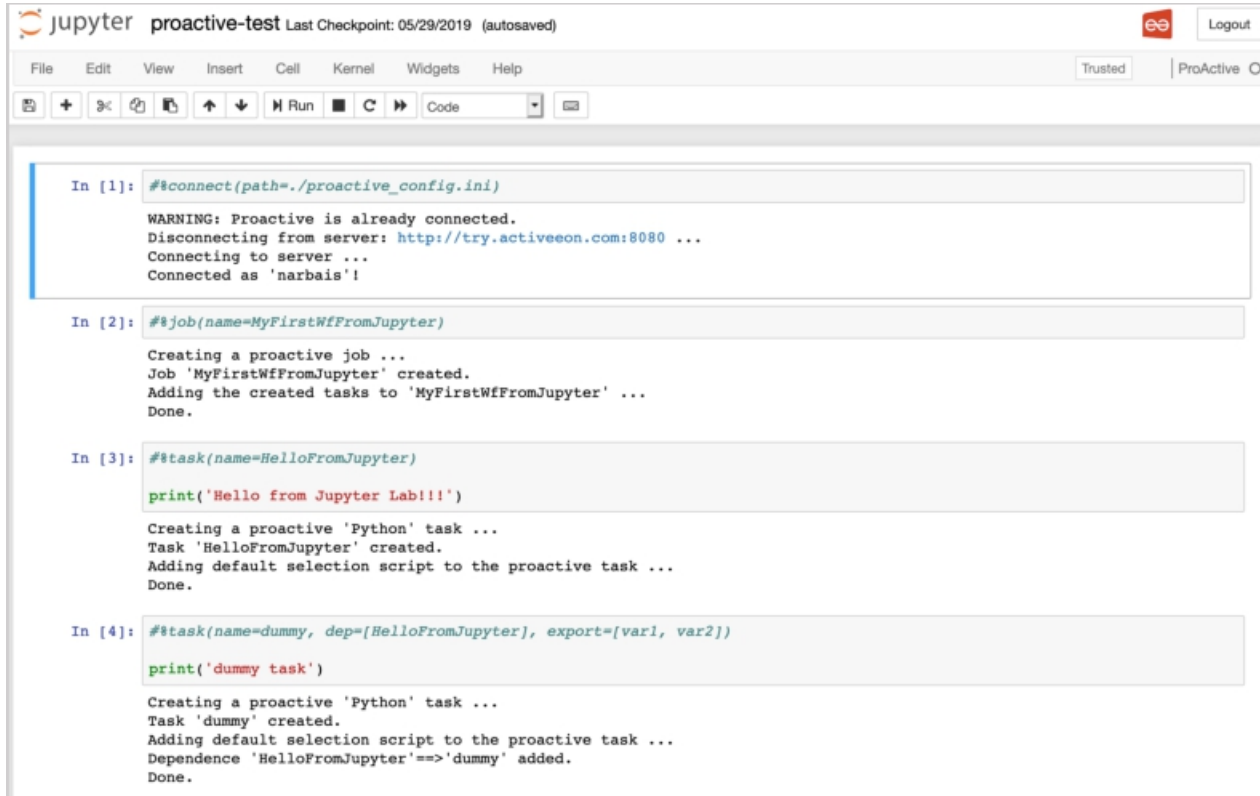
gateway = proactive.ProActiveGateway(...)
gateway.connect(username, password)

proactive_task = gateway.createPythonTask()
proactive_task.setTaskName("SimplePythonTask")
proactive_task.setTaskImplementationFromFile("main.py")

job_id = gateway.submitJob(proactive_job)
job_result = gateway.getJobResult(job_id)
print(job_result)
```

<https://github.com/ow2-proactive/proactive-python-client>

# MLOS : Jupyter Kernel



```
In [1]: %%connect(path=../proactive_config.ini)

WARNING: Proactive is already connected.
Disconnecting from server: http://try.activeeon.com:8080 ...
Connecting to server ...
Connected as 'narbais'!

In [2]: %%job(name=MyFirstWfFromJupyter)

Creating a proactive job ...
Job 'MyFirstWfFromJupyter' created.
Adding the created tasks to 'MyFirstWfFromJupyter' ...
Done.

In [3]: %%task(name=HelloFromJupyter)

print('Hello from Jupyter Lab!!!')

Creating a proactive 'Python' task ...
Task 'HelloFromJupyter' created.
Adding default selection script to the proactive task ...
Done.

In [4]: %%task(name=dummy, dep=[HelloFromJupyter], export=[var1, var2])

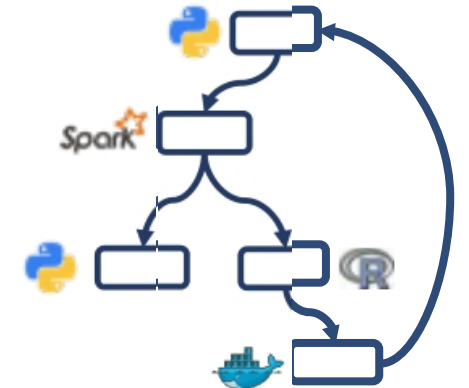
print('dummy task')

Creating a proactive 'Python' task ...
Task 'dummy' created.
Adding default selection script to the proactive task ...
Dependence 'HelloFromJupyter'==>'dummy' added.
Done.
```

Integrate in CI / CD pipelines

workflow as code  
within data scientist  
environment

Reduce opex expenditures with  
integrated production migration

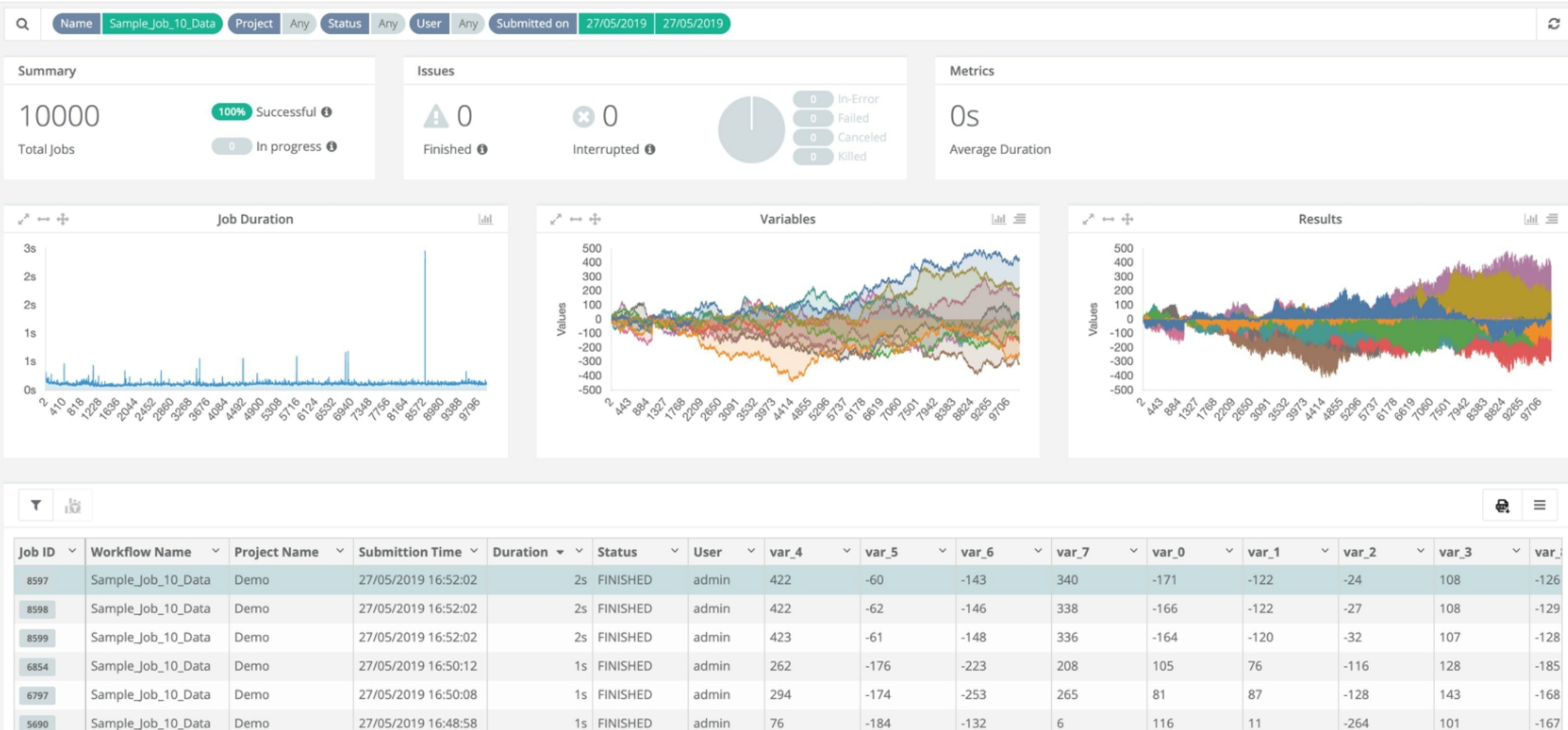


migrate from dev to  
prod seamlessly

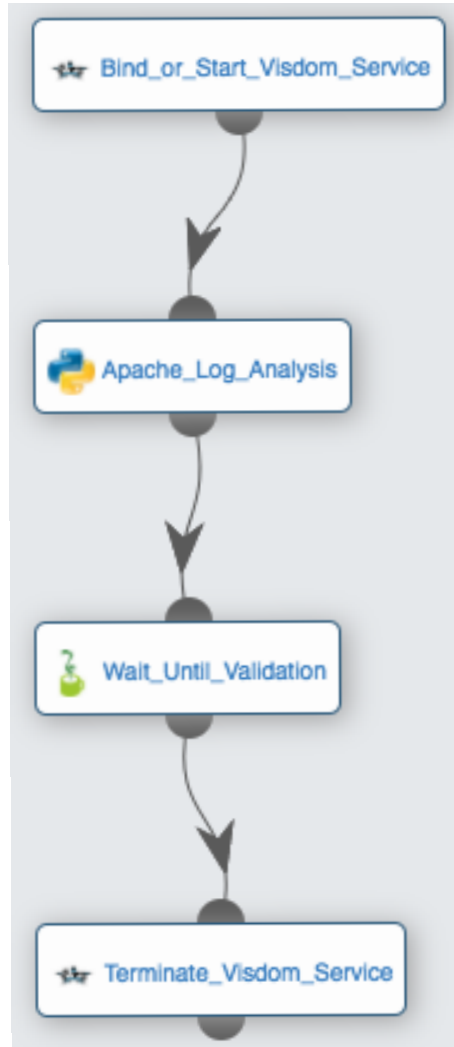




# MLOS : Job Analytics



















# MLOS : Visualization Services





















# MLOS : Supported technologies

## Machine Learning & Artificial Intelligence

															
Cognitive Services	CNTK	Keras	PyTorch	TensorFlow	Scikit-Learn	MXNet	YOLO	H2O	Caffe	Spark MLlib	Pandas	JupyterLab	DeepLearning G4J	DLib	BigDL








## Big Data

															
Zookeeper	Kafka	Azure Databricks	Spark	Hadoop HDFS	Hadoop	Swarm	Storm	Clearwater	Twitter	Cuda	Open/CL	FPGA	Visdom	Grafana	Kibana




## Specialized

## Visualization

## Data Connectors

															
URL	FTP	SFTP	PostgreSQL	Greenplum	MySQL	Oracle	SQL Server	MongoDB	Cassandra	Azure Storage	Azure Data Lake	AWS-S3	SAP	Elasticsearch	Logstash

## Languages and Predefined Tasks

															
Linux Bash	Cmd	Java	Scala	Javascript	Groovy	Ruby	Jython	Python	Perl	PHP	PowerShell	C++/C#	R	Cron	LDAP

## Infrastructure

## Clouds

## HPC Schedulers

															
Linux	Windows	Solaris	AIX AS/400	VMware	Openstack	Azure	AWS	Cloud Platform GCP	Docker	Kubernetes	OpenShift	Slurm	PBS Works	LSF	SGE

# Machine Learning Industrialization




Flexible integration with 3<sup>rd</sup>-part dev-ops software and libraries



 **ProActive**  
Workflows & Scheduling

 Full Rest Api

 ProActive Tasks supporting 10+ languages

  
Pre-processing


  
Learning

 Testing

 Deploying

  
Prediction

 Connector  
IaaS

 Node Selection  
Script

Access any resources

**Local**



**Cloud**



**Clusters**



# Thank you



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